WILDLIFE REVIEW

AN ABSTRACTING SERVICE FOR WILDLIFE MANAGEMENT
ISSUED FOR THE INFORMATION OF COOPERATORS
BY THE
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Washington, D. C. No. 21 May, 1939

Management: Planting

Anon. Permanent food and cover planting for wild life, Minnesota Dept. of Conservation (St. Paul), 3 pp. (8-1/2" x 12"), 2 pls., multilithed, April 1939.

Preparing such facilities is "the most necessary work to be done in Minnesota for the better conservation of valuable wild life." The leaflet recommends triangular plantations (apex to the north), describes their advantages, and suggests planting arrangement and species selection. The illustrations clarify the suggestions.

Management: Planting

Bennett, J. M. Specifications for trees and shrubs, Parks & Recreation (327 West Jefferson St., Rockford, Ill., 25 cents a copy), 22(3), Nov. 1938, pp. 100-110, 6 photos.

The information in this article should be helpful to anyone having the responsibility of placing large orders for woody plants. Suggestions are made as to preliminary communications with bidders and as to the form of contracts, besides those relating to specifications for the plants and stipulations as to their handling.

Management: Planting

Connors, Charles H. Woody plants with ornamental fruits, New Jersey Agr. Expt. Sta. (New Brunswick) Circ. 380, 23 pp., 6 pls., October 1938.

With the exception of a short paragraph on birds in the garden, this publication does not treat wildlife directly. It contains, however, considerable information that may be useful to the wildlife manager. Tables of trees and shrubs with fleshy fruits indicate the height of the various species, the color and season of their flowers and fruits. Much the same information is given for vines, and there is supplemental data on other plants with interesting flowers or pods.

Management: Planting

Pearson, A. M., and J. W. Webb. Planting food crops for game birds, Alabama Polytechnic Institute (Auburn, Ala.) Agr. Expt. Sta., 5 pp., 3 figs., 1 table, mimeographed, March 1939.

Directions as to where, what, when, and how to plant, with table of 14 crop plants showing season of availability of the seeds and their utilization by bob-whites and doves.

Management: Planting

Shepherd, Harry W. Woody plants for landscape use in California, California Agricultural Extension Service Circ. (University of California, Berkeley) 109, 48 pp., 15 figs., 3 tables, Aug. 1938.

Besides general instructions, this publication includes tables listing native and exotic trees, shrubs, and vines suitable for California conditions.

Management: Planting

Wyman, Donald. Hedges, screens, & windbreaks (McGraw-Hill Book Co., 330 West 42nd St., New York, N. Y., $2.50 a copy), 249 pp., illus., 1938.

This volume treats more than 250 plants that can be used for hedge or screening purposes. There is an alphabetical descriptive list, with notes on use, care, and hardiness (indicated by figures referring to zones on maps at both the beginning and the end of the volume). The uses of hedges, planting practices, and care after planting are discussed, and there are selections of plants for different purposes as for ornament, protection, screens, windbreaks, and shelterbelts, and for particular regions. Exotic as well as native plants are included.

Management: Planting, Minnesota

Booglin, Louis. Hardy plants with ornamental fruits in Minnesota, Parks and Recreation (327 West Jefferson St., Rockford, Ill., 25 cents a copy), 22(4), Dec. 1938, pp. 186-188.

Listed according to seasons and colors; a section on plants whose fruits are available in summer and in winter. There are special notes on bittersweet, crab apples, mulberry, mountain-ash, and elders.

Management: Planting, partridge peas

Massey, A. B. Native food plants. The partridge peas, Virginia Wildlife (Blacksburg, Va.), 2(2), Oct. 1938, p. 5.

Cassia nictitans and C. fasciculata. Appearance, value to birds; collecting and scarifying seeds; treating seed with boiling water and sand; sowing.

Management: Planting, shelterbelts

Tronk, F. B. Wisconsin's shelterbelts grow longer, Wisconsin Conservation Bul. (Wisconsin Conservation Dept., Madison), 4(4), April 1939, pp. 3-8, 4 photos.

Value of shelterbelts in enhancing crop production; interest of farmers; more than 4 million tree sets distributed from State nursery in 5 years. A secondary value is the added winter cover afforded game birds and animals, more needed now than ever because natural groves on farms are being depleted.

Management: Planting, storage of seeds of aquatic plants

Sharp, Ward M. Propagation of Potamogeton and Sagittaria from seeds, American Wildlife (Investment Bldg., Washington, D. C., 25 cents a copy), 28(2), March-April 1939, pp. 87-93, 3 photos.

Large scale methods developed at the Valentine Migratory Waterfowl Refuge, Nebraska, for harvesting, preserving, and planting seeds of Potamogeton pectinatus, P. zosteriformis, and Sagittaria latifolia. The Sagittaria seeds were stored semi-dry and those of Potamogeton wet. Treatments for breaking dormancy of the seeds so as to shorten the period of storage are described.

Management: Planting for birds

Jenson, L. P. Fruit and berry-bearing trees and shrubs, Parks and Recreation (327 West Jefferson St., Rockford, Ill., 25 cents a copy), 22(3), Nov. 1938, pp. 116-118.

"Birds add greatly to the charm of any landscape, and by providing them with proper food and shelter we may be sure of their abundance." Native and exotic trees and shrubs useful in Missouri are listed together with information as to the color of their fruit and as to their bearing season.

Management: Planting for wildlife; muskrats

Gillese, John. Muskrat farming, Hunter-Trader-Trapper (386 South 4th St., Columbus, Ohio, 15 cents a copy), 78(1), Jan. 1939, pp. 49-50.

Consists mainly of statements about the value to muskrats and methods of planting the following: Wildrice, spatterdock, cattail, wapato, sweetflag, white waterlily, pink pond lily, bulrush, wildcelery, and bur-reed.

Management: Planting for wildlife, shelterbelts

O'Connell, Frank B. Shelter belts for wildlife, Outdoor America (1167 Merchandise Mart, Chicago, Ill., 10 cents a copy), 4(2), Dec. 1938, pp. 4-5, 3 photos.

Shelterbelts while planned to increase agricultural productivity are of value also to wildlife. They have the advantage too of being an adjunct to agriculture of which the farmer can approve that is helpful in relation to wild animals. In Texas the usefulness of shelterbelt plantings to wildlife has already been demonstrated and such areas have been used for refuges on cooperative game preserves. Similar objectives are in view also in other plains States. The nature of the belts, the trees used in them, and the ways in which they aid crops and wildlife are noted in some detail.

Management: Planting for wildlife and erosion control

Rule, Glenn K. Soil defense in the Northeast, U. S. Dept. Agr. Farmers' Bul. 1810 (Supt. of Documents, Washington, D. C., 15 cents a copy), 69 pp., 39 figs., 1938.

Page 36 is allotted to Wildlife Plantings. Wildlife can survive and multiply only where there is sufficient cover and food. When planting for erosion control, conservationists keep in mind needs of wildlife. A list of shrubs and trees suitable for planting in the region is given.

Management: Pond development

Davis, Cecil N. Utilizing farm ponds for wildlife, Soil Conservation (Supt. of Documents, Washington, D. C., 10 cents a copy), 4(9), March 1939, pp. 230-232, 1 table.

Drought in the west stimulating interest in water conservation, facilitated the Soil Conservation Service's program of gully control by impoundment. Not only were water control needs met, but by planting and other special treatment, water supply sites were made into excellent wildlife habitats. Results in Missouri are described. Fencing to exclude livestock is of first importance; the animals can be watered at troughs outside the area being developed. Cover restoration, planting of shrubs and trees for windbreaks and shade, and establishing marsh and aquatic vegetation to control wave action, strain out silt, and bind banks, are other measures employed. Directions for planting are given and the species recommended are listed. The table indicates the utility of 26 groups of plants as silt-strainers, bank-binders, wave-breakers, and spring-inhabitants, and as wildlife foods.

Management: Present trends

Simmons, James R. Feathers and fur on the turnpike, Christopher Publishing House (Boston, Mass., $1.75 a copy), 148 pp., 10 pls., 3 figs., 4 tables, 1938.

2. A study of the present trends in wildlife conservation, pp. 11-12, 95-148. "Wildlife conservation, with its accompanying profession of wildlife management, is emerging as a distinct unit, just as forest conservation with its accompanying profession of forestry emerged some fifty years ago in America." The discussion is by a forester with a sympathetic attitude toward wildlife management. "Forestry practice and wildlife management should develop together." Game technicians and foresters should strive to compromise between extreme points of view. The writer is not in favor of concentrating all Federal conservation activities in one Department. He urges that wildlife management benefit non-game, as well as game, species. Considerable space is devoted to the prospects of correlating forest management and wildlife management, the outlook being, in the writer's opinion, hopeful. On the vexed question of burning, he says: "In the untouched forest Nature had to make some of her openings by the use of fire. Hence, if we want the wildlife in managed forests we must substitute clearings to a reasonable extent" (p. 116). On

another controversial question he writes: "The more it is studied the less enthusiasm can be mustered in favor of the combination public shooting ground and wildlife sanctuary" (p. 116). Activities of arms and ammunition interests, while on the whole commended, are criticized as being too exclusively for the benefit of game species and as putting too much emphasis on "vermin" control. Cooperative research on wildlife is praised. The effect of silvicultural operations upon wildlife are discussed with largely favorable comment. There is a chapter on the training of a wildlife conservationist, and a prophetic postscript entitled, "The Work Ahead." It portrays wonderful opportunities, forecasts great improvement in the relations of mankind and wildlife, and asserts that, "wildlife conservation is on the march."

Management: Refuges

Cox, William T. Marsh firebreaks--a boon to wildlife, American Forests (919 Seventeenth St., N. W., Washington, D. C., 35 cents a copy), 45(3), March 1939, pp. 109-111, 137, 6 photos.

On the Beltrami project, Minnesota, an unwisely drained area, construction of numerous small dams in marginal ditches, protected the area from fire, and held up the water level so that the soil became saturated, and small ponds filled. The response of wildlife has been gratifying, especially in the case of beavers and waterfowl, but all resident species, including deer, elk, caribou, and moose, are profiting. The cost of development did not exceed $1.00 per acre.

Management: Refuges

Gabrielson, Ira N. Range restoration, Bird-Lore (1006 Fifth Ave., New York, N. Y., 30 cents a copy), 41(2), March-April 1939, pp. 63-66, 2 photos.

Restoration of vegetation chiefly due to elimination of grazing domestic animals has been amazing on the Charles Sheldon Antelope Refuge and Range in Nevada and the Hart Mountain Refuge in Oregon. It seems quite probable that a moderate reduction in the number of livestock on many ranges will result in equally rapid recovery. The author is of the opinion "that a large part of the overgrazed lands of the West can be rapidly improved and that the real problem areas are much smaller in extent than we have been led to believe."

Management: Refuges

Manweiler, Jack. Minnesota's "big bog," Minnesota Conservationist (Dept. of Conservation, St. Paul, Minn., 15 cents a copy), 63, December 1938, pp. 12-13, 24-25, 28, 3 photos; Wildlife management in Minnesota's "big bog," 65, January 1939, pp. 14-15, 23, 27, 5 photos; Woodland caribou in the "big bog," 65, February 1939, pp. 16-17, 23, 30, 4 photos. Evidently there is an error in the serial numbers.

December. The big bog is an unsuccessfully drained area of about 2,000,000 acres in northern Minnesota. It is the site of the Beltrami and

Pine Island land utilization projects. The first installment describes the tract and some of the things done to develop it, and gives general information on the wildlife present.

January. This part comments briefly on work with a variety of animals. Banding, population, and disease investigations of snowshoe hares are in progress; a new filarial parasite has been discovered. Transplanting and artificial feeding of beavers have been undertaken and a means worked out of identifying beaver blood as a clew to poaching. Creating of ponds both by impoundments and excavations (blasting) have improved the habitat for moose; Bang's disease, an important livestock malady, was identified in one moose. A nervous disturbance called moose disease also is reported upon. Parasites of elk, starvation of deer, control of wolves, study of game birds, and food and cover planting also are discussed.

February. Account of the dwindling caribou herd and of the capture and transportation of Canadian animals to restore it. The subject is treated in other articles by the same author abstracted elsewhere (pp. 11, 12) in this issue of WILDLIFE REVIEW.

Management: Refuges

Rutledge, Archibald. Private game preserves, Farm Journal (Washington Square, Philadelphia, Pa., 5 cents a copy), July 1938, p. 7. Also in Conservation (919 - 17th St., N. W., Washington, D. C., 20 cents a copy), 4(5), Sept.-Oct. 1938, pp. 33-34.

Hunters are so numerous that in the author's opinion it will soon be necessary for success to go to a wilderness or join a club which controls a private game preserve. "I surely see this day coming if every landowner on whose property any game has its range does not set aside a certain part of his property as an inviolate game refuge." Illustrations of the value of such refuges are given.

Management: Refuges

Wakeman, Max. Wildlife laboratories--the game refuges, Michigan Conservation (Michigan Dept. of Conservation, Lansing), 8(3), Nov. 1938, p. 10.

Though hunting is prohibited on some and closely restricted on others of the State game areas, they, nevertheless, contribute to the improvement of hunting by serving as testing grounds for a variety of experiments. The research program is outlined, and classification of the areas (20 in number), their location and combined acreage stated.

Management: Refuges for pheasants

Leedy, Daniel L. What constitutes a good pheasant refuge?, Ohio Wildlife Research Station (Ohio State University, Columbus), Release 85, 4 pp., mimeographed, Jan. 1938.

Summary of extensive Ohio experience with areas managed to populate surrounding territory by overflow or to produce stock that is trapped and moved elsewhere. As to size, a refuge of 200 acres largely in crops, but including 40-60 acres of woodland will winter 2,000 pheasants. Because of the risk of crop damage, it is usually inadvisable, however, to maintain populations of more than 150-200 birds to the square mile. It is important to take farmer sentiment into consideration in selection of a refuge site. A central, and 4-5 scattered auxiliary, refuges to a township are recommended. They are safer for the birds if remote from main highways. Large acreages of grain crops succeeded by weedy stubble are necessary, and there must be plenty of well distributed cover. Winter roosting sites may be in woodlots, thickets, or fields of old sweet clover or weeds. Sites in which pheasants can nest undisturbed are very desirable. Fox squirrels and rabbits compete for food but do not otherwise interfere with pheasants, but large populations of raccoons, skunks, opossums, weasels, hawks, and crows may be harmful and require control. "However, the most important predator control is that directed against men, cats, and dogs."

Management: Salting

Case, George. The use of salt in sparing winter range on the Selway, University of Idaho (Moscow) Bul. 33(22), Dec. 1938, pp. 27-29.

This material has previously been abstracted from 2 sources; see WILDLIFE REVIEW, No. 15, July 1938, pp. 28, 35.

Management: Seal, Fur

Bower, Ward T. Alaska fishery and fur-seal industries in 1937, U. S. Bureau of Fisheries, Administrative Report 31 (Supt. of Documents, Washington, D. C., 15 cents a copy), 150 pp., 1938.

Notes on protection of walruses and sea lions. Take of whales, the first under the international treaty for the regulation of whaling, was slightly in excess of that for the previous year. The status and utilization of blue foxes and reindeer on the Pribilof Islands are discussed and there is a 25-page report on the fur-seal industry. The herd numbered more than 1,800,000 and the take of skins was 55,180. The full account of a computation of the fur seals by sexes and age classes, with remarks on mortality at sea, and suggestions as to management, is by Harry J. Christoffers.

Management: Seed, breaking dormancy of Crataegus

Flemion, Florence. Breaking the dormancy of seeds of Crataegus species, Boyce Thompson Inst. (Yonkers, N. Y.) Contributions 9(5), July-Sept. 1938, pp. 409-423, 2 figs., 7 tables.

Materials, methods, and results are described and tabulated. "All Crataegus seeds have dormant embryos which must be subjected to a period at low temperature in a moist medium before germination occurs." A separate inhibiting coat-effect in some species can be overcome by treatment with acid and high

temperature. "By proper treatment seedlings of all Crataegus species studied can be obtained on a large scale the first spring after the seeds ripen." Bibliography of 11 titles.

Management: Soil conservation in relation to wildlife

Fox, Adrian C. Annual crop buffer windbreaks, Dakota Farmer (The Bushnell Co., Aberdeen, S. Dak.), March 11, 1939, pp. 96-97, 3 photos.

Corn, millet, sorghum, and sunflowers planted in long rows on field borders and on contours to decrease wind erosion and hold drifting snow proved to be of considerable value in providing travel lanes, cover, and food for both native and introduced game birds. The utility of conventional food patches with a greater variety of both tall and low growing seed producers also is emphasized.

Management: Soil conservation in relation to wildlife

Holt, Ernest G. Birds and beasts aid erosion control, American Wildlife (Investment Bldg., Washington, D. C., 25 cents a copy), 28(2), March-April 1939, pp. 79-86, 5 photos.

Popular account of wildlife benefits due to erosion control practices as revegetation, control of grazing and fire, strip cropping, terracing, and soil protection on areas not under cultivation.

Management: Soil conservation in relation to wildlife

Turner, L. T., and A. B. Hatch. The influence of soil conservation practices on upland game birds on Idaho farms, University of Idaho (Moscow) Bul. 33(22), Dec. 1938, pp. 67-69.

Most practices that favor soil conservation also benefit game. Control of hunting and predation, even if supplemented by restocking, mostly has failed to maintain abundance of game but success has come from adding to those, environmental development. Soil conservation practices now used in Idaho produce optimum conditions for Hungarian partridges and ring-necked pheasants. Suggestions are given for dry farms, irrigated lands, and cattle ranges.

Management: Spraying wild fruit

Chapman, Floyd B. Use of chemical sprays to increase yields of fruits utilized by wildlife, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C., 75 cents a copy), 3(2), April 1939, pp. 141-143, 1 table.

Author's abstract: A survey of natural wildlife foods and factors controlling their production in southern Ohio indicated that certain insect pests and fungus diseases, some of which attack domestic fruits also, are responsible for decreased palatability, premature abscission, decay before ripening, or complete destruction of wild fruits. The wildlife manager might profitably

utilize certain chemical sprays, especially in managed refuges, in order to improve the yield and quality of certain fruits and to prolong their availability into critical periods. The use of a lead arsenate spray on two species of wild grapes (Vitis aestivalis and V. labrusca) gave excellent results in controlling the grape berry moth. Vines treated with two applications of a spray prepared by dissolving 4 level tablespoonfuls of lead arsenate in one gallon of water with a soap spreader retained their fruits until midwinter when they were most useful to ruffed grouse, songbirds, and certain mammals."

Management: Stocking

Allen, Durward L. Nature versus the incubator, Michigan Conservation (Michigan Dept. of Conservation, Lansing), 8(4), Dec. 1938, pp. 4-5, 8-10, 5 photos.

Reproductive potential is such that any species unchecked would soon overrun the earth. "This fact is vital in comparing the rate of natural reproduction to the possibilities of artificial propagation. Even if we spent the last penny of all available game funds we could not artificially propagate as many animals of any species as would be reproduced naturally, under favorable conditions. Artificial propagation is inevitably limited by financial cost and many other practical considerations, and the number of animals that can be reared artificially is but a fraction of the number that can be reached in natural reproduction. From this it reasonably follows that if the natural production of a species is continuing normally and still the amount of game is deficient, there is little hope of creating an abundance through artificial propagation. That would be like pouring a teacup of water into a hole down which a barrel already has been poured. Plainly, attention needs to be given to that other essential consideration--percentage of survival--and an investigation be made of the habitat."

Habitat must be favorable if restocking operations are to succeed and nothing is accomplished by stocking beyond carrying capacity. References are included to illustrative findings in Pennsylvania, Wisconsin, and Minnesota, and description of hypothetical examples of useless restocking. Stresses the need of more detailed knowledge of all the factors involved but ends by saying, "One conclusion seems quite clear. If we persist in reducing the carrying capacity of game range by the destruction of cover and continue other damaging practices, and then proceed to overshoot those maltreated areas, we can release imported or coop-reared game into them indefinitely without gaining anything but experience."

Management: Stocking

Hatch, A. B. The refuge trapping system of pheasant management, University of Idaho (Moscow) Bul. 33(22), Dec. 1938, pp. 60-63, 1 table.

Reviews Connecticut and Pennsylvania experience as to the relation of stocking of pen-raised pheasants to the hunting kill and says: "The truth is that birds which are raised in the wild at no cost to the state apparently provide the bulk of the hunting kill, and the larger the release program,

although the cost per bird may be lower, the less effective become the dollars spent in artificial propagation. In recognition of this situation, most states, which have been studying these problems for a number of years, have finally directed their major attention to methods for increasing the success of wild propagation. One of the most successful techniques found so far has been the so-called refuge trapping system." Ohio and Idaho illustrations are cited which show that this system is highly efficient and economical.

Management: Stocking caribou

Manweiler, John. Woodland caribou study in northern Minnesota, Parks and Recreation (327 West Jefferson St., Rockford, Ill., 25 cents a copy), 22(2), Oct. 1938, pp. 74-78, 2 photos, 1 map.

Decline of the Minnesota herd to 4 individuals. Reasons: Limited range, lack of winter food, drowning of young in drainage ditches, poaching, parasitism and disease, inbreeding and sterility, and lack of calving range. List of 20 foods in the order of their preference in March and April. Environmental conditions have been improved and predators combatted. Ten individuals from Saskatchewan have been brought in, and kept in an enclosure of electrified fencing to serve as the nucleus of a herd, which it is hoped can be protected and will increase.

Management: Stocking cottontail

Hickie, Paul. Rabbits--and some of the costly myths about restocking them, Michigan Conservation (Michigan Dept. of Conservation, Lansing), 8(6), Feb. 1939, pp. 4-5, 8, 10-11, 2 photos.

Review of experience, particularly in Pennsylvania and Ohio, and conclusion that there have been no beneficial results, and that neither importation nor propagation of rabbits has been demonstrated to be financially justifiable. The parallel to pheasant management inferred by sportsmen is false for the vital reason that eggs and young of pheasants can be handled by machines while the young of rabbits can be cared for on any extensive scale only by their mothers in the wild. The author comments, with respect to pheasants also that "once the state is populated there is little that can be done with game farm stock to build up the wild population." See also abstract under Diseases and Parasites: Tularemia a bar to importation of rabbits, in WILDLIFE REVIEW, No. 19, April 1939, p. 24.

Management: Stocking game birds, Pennsylvania

Wessell, Chas. W. The chukar partridge, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg, 10 cents a copy), 9(12), March 1939, pp. 10-11, 31, 3 photos.

Discussion of the chances of success, and account of experiences to date, with this species. Of exotic birds already tried, the ring-necked pheasant is well established, the Hungarian partridge is still on trial, and the Reeves pheasant has proved unsatisfactory.

Management: Stocking pheasants

Wessell, Charles W. The six-week old pheasant program, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg, 10 cents a copy), 9(10), Jan. 1939, pp. 4-5, 30, 6 photos.

Directions for rearing pheasants received at the age of six weeks, including description and illustrations of holding pens; and instructions for care and feeding, netting and handling birds; treatment of diseases and vices; and for liberating the birds.

Management: Transplanting elk

Bagley, Lester. History of the Big Horn Mountain elk herd, Wyoming Wildlife Magazine (Game and Fish Department, Cheyenne, Wyo.), 3(11), Nov. 1938, pp. [1-3], 1 table, mimeographed.

Methods and cost of transferring elk from Jackson Hole to the Big Horn Mountains. Steady growth of the herd in the new environment tabulated. Animals were first moved in 1910 and open seasons have been allowed since 1925.

Management: Trapping caribou

Manweiler, John. Woodland caribou from Saskatchewan , Parks and Recreation (327 West Jefferson St., Rockford, Ill., 25 cents a copy), 22(3), Nov. 1938, pp. 134-138, 3 photos.

The successful method was snaring with quarter-inch rope, which is described in detail. Eighteen caribou and one moose were captured of which 11 escaped. Recommendations for transportation and care based on experience are made.

Management: Trapping prairie grouse

Hamerstrom, F. N., Jr., and Millard Truax. Traps for pinnated and sharp-tailed grouse, Bird-Banding (Charles B. Floyd, 210 South St., Boston, Mass., 75 cents a copy), 9(4), Oct. 1938, pp. 177-183, 5 figs.

These birds are difficult to entice into traps and to guard from injury through all phases of trapping. Wire-netting was finally abandoned almost entirely in favor of soft materials. Funnels, buffers, and other details of construction are described and illustrated for 5 types of traps. Directions for baiting and operating the traps also are given.

Management: Wildlife on the range

Compton, Lawrence V. Wildlife and the range, Soil Conservation (Supt. of Documents, Washington, D. C., 10 cents a copy), 4(9), March 1939, pp. 215-217.

The western range comprises lands supporting primarily forage and browse plants which are used mainly for production of livestock; they amount to some 728,000,000 acres, or 40 percent of the land surface of the United States. Cultivation affects only about 4 percent of the range; its effects upon wildlife are about equally detrimental and beneficial. The range continues to be the main reliance of the principal native species of wildlife and range deterioration seriously affects them. Control of environment for erosion prevention has a counter effect. Retirement of submarginal lands, regulation of grazing elsewhere, and conservation and development of water supplies are some of the remedies. Examples are cited of the benefits to wildlife resulting from their application. The financial returns arising from the presence of wildlife are summarized. From all points of view, it is desirable that wildlife be managed as one of our valuable renewable resources.

Management: Winter feeding

Bailey, Robeson. Old John needs a hand-out, National Sportsman (275 Newbury St., Boston, Mass., 10 cents a copy), 81(1), Jan. 1939, pp. 9-15.

Need of winter feeding of game birds where considerable snow falls. Recommends wide distribution in small quantities (3-5 lbs.) to avoid concentrating birds and thus attracting predators. The food benefits numerous forms of wildlife besides game birds and supplying it gives an interest in upland gunning that shooting alone can never yield. A corn and oystershell mixture was used.

Management: Winter feeding

Miller, Fred. Upland feed, Minnesota Conservationist (Dept. of Conservation, St. Paul, Minn., 15 cents a copy), 62, Nov. 1938, pp. 13, 32, 2 photos.

"Complete elimination of artificial feeding of Minnesota's upland game birds is the goal." Experience with costly feed purchasing revealed that winter feeding is less than 15 percent efficient, that rabbits and other mammals consumed a large portion of the feed, and that predators took toll of the birds concentrated at feeding stations. Planting of black amber cane and millet by farmers is the chief reliance now. Seed is furnished by the Department of Conservation, the farmer cuts and shocks the grain but leaves part of it in the field over winter. He shares in the grain crop and gets all of the fodder. Food-producing trees are being planted on refuges, but later will be supplied for use elsewhere. The new practices have resulted in considerable savings. In 1938, 3,984 acres of cane and 2,368 of millet were planted, averaging, respectively, 52-1/2 and 31 acres per county.

Management: Winter feeding, squirrels

Chapman, Floyd B., and Luther L. Baumgartner. Winter feeding of squirrels, Ohio Conservation Bul. (Ohio Conservation Division, Columbus, 5 cents a copy), 3(2), Feb. 1939, pp. 6-7, and inside back cover, 2 figs.

Winter feeding, to be really valuable, must be definitely planned and faithfully carried out. To correspond with the range of fox squirrels there should be one feeding station to each 25 acres. Feeding apparatus is illustrated and foods recommended, as black walnuts, raw peanuts, and corn. A table shows percentages of digestible nutrients of 10 possible squirrel foods. Directions are given as to where and how to place winter foods.

Management: Winter range

Olsen, Orange A. Winter range as a limiting factor in big game management, University of Idaho (Moscow) Bul. 33(22), Dec. 1938, pp. 20-22.

In general the areas most intensively occupied by man were the winter ranges of Idaho's big game. The subsistence resources for wildlife must be available at every season as needed, but there is a weak link now in the chain, namely, dearth of suitable winter range. The national forests include chiefly mountainous country and but little foothills to which big game formerly migrated in winter. In severe seasons, about 45 percent of the animals now leave the forests and many die. It is hoped under the Taylor Grazing Act and the Pittman-Robertson Act for Federal aid in wildlife restoration to make additional winter range available. It is around such range that management must revolve.

Minnesota: Annual report, Department of Conservation

Speakes, Harry E. Division of Game and Fish. Minnesota Dept. of Conservation (St. Paul) Ann. Rep. 1938, pp. 40-99, tables, 1939.

Contains estimate of the total value, and annual harvest value, of the principal species of game and fish of the State, at $24,500,000 and $4,561,989, respectively. Minnesota has the largest area of game refuges of any State--a total of 185 covering 3,411,450 acres. Black amber cane and millet food patch planting was continued in many counties, aggregating more than 6,000 acres. A tabulation of the game kill for 1936 and 1937 is presented; migratory waterfowl numbered more than 1,300,000 and made up more than half of the total head of game taken. The report includes statistics on the population and kill of deer on State and national forests, and estimated total bag of deer each year from 1932 to 1937. There are notes on the status of the moose, elk, and caribou, parasite and disease investigations, and on food habits of several species. Analyses of the contents of 54 stomachs of mourning doves revealed weed seeds as the most important elements of the diet, 5 species making up 87 percent of the food. A graph shows the chief results of study of 659 stomachs of ring-necked pheasants; grains outrank other foods. There are less detailed notes on dietary studies of the ruffed grouse, foxes, skunk, hawks, and cormorants.

Natural History: Birds, Allegany State Park, N. Y.

Saunders, Aretas A. Studies of breeding birds in the Allegany State Park, New York State Museum (Albany) Bul. 318, 160 pp., 77 figs., tables, Dec. 1938.

Description of the area and of its forest types; tabulation of breeding birds according to habitat for 3 years, 1932-1934. Annotated list of the species, summary, and bibliography of 42 titles. The average number of pairs of birds on 225 acres for the 3 years was 173. The red-eyed vireo and black-throated green warbler were the most common forms.

Natural History: Birds of Tennessee

Wetmore, Alexander. Notes on the birds of Tennessee, U. S. National Museum (Washington, D. C.) Proc. 86(3050), pp. 175-243, 1939.

Annotated list of 185 species and subspecies based on collections of the National Museum, mainly those obtained by recent expeditions.

Natural History: Birds of Texas

Rutland, Don. Editor. Preliminary check list. Birds of East Texas, East Texas Ornithology Club (Commerce, Texas), 30 pp., mimeographed, 1938.

List of 215 forms; occurrence, status, and significant dates given.

Natural History: Fauna of Olympic National Park

Cahalane, Victor H. A wildlife picture of Olympic National Park, National Parks Bul. (1624 H St., N. W., Washington, D. C.) 14(66), Dec. 1938, pp. 20-24, 1 map, 1 photo.

The map shows the boundary of the former Mount Olympus National Monument and of the enlarged Olympic National Park, Washington. The text discusses the more prominent animals and the management problems they present. The mule deer and mountain goat have been introduced; the native wolf has been exterminated and coyotes are coming in.

Natural History: Flora and wildlife of Tennessee

Allred, Charles E., Samuel W. Atkins, and Benjamin D. Raskopf. Human and physical resources of Tennessee, III, IV, Flora, Wildlife. College of Agriculture (University of Tennessee, Knoxville) Rural Research Monograph 42, pp. v+32-53 , figs. 1+10-13, May 1937.

General discussion, remarks on regional phenomena (maps), and bibliographies. The text on birds, mammals, and fishes discusses kinds and distribution, values, conservation, and restocking. Treatment of turtles, frogs and toads, snakes, and lizards is briefer.

Natural History: Fur and game mammals of Alaska

Alaska Game Commission. Distribution of game and land fur-bearing animals in Alaska 1938 (Biological Survey, Washington, D. C.). Cover and 25 maps, 1939.

Each map shows the distribution of an animal group by dots representing 100 individuals. The method is not clear for groups entitled to only a few dots or confined to the coast where the dark markings of the map are very prominent--6 instances in all. According to the maps, weasels are the most widely distributed and caribous the most numerous mammals.

Natural History: Indication of age of waterfowl

Ticehurst, Claud B. On a character of immaturity in the Anatidae, Ibis (51 Onslow Gardens, London, S. W. 7, England, 12 shillings 6 pence a copy), Ser. 14, 2(4), Oct. 1938, pp. 772-773.

"Striae", i.e. vertical darker lines on a lighter ground at the tip of the nail of both upper and lower mandibles are present in all downy ducklings and probably in all goslings. A low power lens may be needed to reveal them. In general they seem to fade in the first spring after the year of birth and are gone by the following autumn or winter. In some cases they persist longer but "their presence or absence may be of some help in determining whether a duck or goose in adult dress is a young adult or an old one."

Natural History: Legumes of Wisconsin

Fassett, Norman C. The leguminous plants of Wisconsin (University of Wisconsin Press, Madison, $3.00 a copy), 157 pp., 24 pls., 59 figs., numerous maps, 1939.

This book contains an artificial key to the nearly 100 species of legumes known from the State and keys to the genera based on flowers and fruits. There is also a key to seeds of groups, in some cases, genera, in others, species. There are descriptive and distributional notes for all species, and maps showing the distribution in Wisconsin or even the entire range for many. In addition the work is profusely illustrated with drawings by Professor Richard I. Evans and photographs by the author. A section on epidermal outgrowths with key and illustrations by Catherine Mose suggests that fragmentary material (as from animal stomachs) may be traced to the genera at least by the shape and sculpturing of the trichomes. Included in the book are a glossary and index. The author is well known as a thorough and ingenious taxonomist; as a result, and also in view of the lavish use of excellent illustrations, the work sets a new high in quality for State reports on plants.

Natural History: Mammals of Idaho

Davis, William B. The recent mammals of Idaho (Caxton Printers, Ltd., Caldwell, Idaho, $5.00 a copy), 400 pp., 2 pls., 33 figs., April 1939.

The author's native State is the type locality for 43 species and subspecies of mammals; the complete list comprises 141 forms, of which 15 are widely distributed. The type localities are catalogued and mapped and all collecting stations are annotated in a gazeteer. Other chapters of general import relate to geography of the State (with relief map), floral provinces,

distributional areas, and problems of distribution. The systematic accounts include standard scientific and vernacular names, references to original descriptions, synonyms, descriptive and distributional notes, and records of occurrence. There are keys to many but not all groups, and numerous distribution maps. Several nomenclatorial changes are made and three subspecies described as new. There is a bibliography of more than 9 pages and a detailed index. A thorough work, increasing and summarizing knowledge of mammals in a region important for comprehension of the usonian fauna.

Natural History: Mammals of Quebec

Anderson, Rudolph M. Mammals of the Province of Quebec, Provancher Soc. Nat. Hist. Canada (Quebec) Ann. Rep. 1938, pp. 50-114, 1 map.

Annotated list of 126 species and subspecies. The scientific name and its original reference, and both English and French vernaculars, are given. The bibliography exceeds 10 printed pages.

Natural History: Mammals of Tennessee

Kellogg, Remington. Annotated list of Tennessee mammals, U. S. National Museum (Washington, D. C.) Proceedings, 86(3051), 1939, pp. 245-303.

Account based on National Museum and Biological Survey collections and on the literature, citations to which cover 2-1/2 pages. Eighty-four species and subspecies are included.

Natural History: Papaw

Gould, H. P. The native papaw, U. S. Dept. of Agriculture Leaflet 179 (Supt. of Documents, Washington, D. C., 5 cents a copy), 6 pp., Feb. 1939.

The author says nothing about wildlife, but as papaws are utilized managers may wish to know of this source of information on the name (Asimina triloba) and relationship, range, characteristics, habits of growth, and propagation.

Natural History: Reptiles of Arkansas

Schwardt, H. H. Reptiles of Arkansas, Arkansas Agr. Expt. Sta. (Fayetteville, Ark.) Bul. 357, 47 pp., 53 figs., June 1938.

General remarks on life histories and economic importance of reptiles and on snake myths. Descriptive and distributional notes on snakes and illustrated key to the species. There is a special section on poisonous snakes and treatment of their bites. The lizards receive treatment similar to that of the snakes except that the key is not illustrated; for the turtles there is no key. The number of species included is of snakes, 45; lizards, 11; and turtles, 20. Bibliography of 22 titles.

Natural History: Reptiles of Ohio

Conant, Roger. The reptiles of Ohio, American Midland Naturalist (Notre Dame, Ind., $1.00 a copy), 20(1), July 1938, pp. 1-200, 26 pls., 38 maps.

An exhaustive and well-illustrated work bringing to date information about 39 species of reptiles known to occur in Ohio. The account of each species includes descriptions and measurements, records of specimens examined, statements of general and local ranges (both mapped), and notes on habitat, abundance, and habits. General chapters include a check-list, a key, notes on doubtful records and possible additions, ecological and historical summaries, a bibliography (5 pp.), index, collecting instructions, and suggestions as to first aid in case of venomous snake bite.

Natural History: Warblers of New Jersey

Hausman, Leon A. The warblers of New Jersey. Part 1, Summer resident warblers, New Jersey Agr. Expt. Sta. (New Brunswick) Bul. 646, 48 pp., 20 figs., April 1938.

General traits including food habits, simplified color key, key to songs, and 20 specific accounts each of which includes description, and notes on identification marks, habits, song, and local range. A well prepared and well illustrated bulletin.

Natural History: Wildlife of salt marshes

McAtee, W. L. Wildlife of the Atlantic Coast salt marshes, U. S. Dept. of Agriculture Circ. 520 (Supt. of Documents, Washington, D. C., 10 cents a copy), 28 pp., 6 pls., 10 figs., March (April) 1939.

An illustrated revision of Biological Survey Wildlife Research and Management Leaflet BS-17 which was prepared primarily for educational use in CCC camps; the printed form may be useful also in schools. It discusses zones of salt-marsh plants, and several of the species of plants in relation to wildlife. The birds observable in salt marshes are treated at some length as to characteristics and habits, and other vertebrates more briefly. The introduction is chiefly a brief essay on conservation.

Predation: Hawks vs. quail

Boadel, H. L. Hawks vs. quail on quail preserves, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C., 75 cents a copy), 3(1), Jan. 1939, pp. 42-45.

Experience of a lifelong hunter and preserve owner for a score of years with hawks in relation to quail. Kills by hawks are by no means so common as ordinarily assumed and those birds often get cripples that are best eliminated anyway. Moreover, the hawks feed on rodent and serpent enemies of quail. Blue darters or accipitrine hawks are an exception but as the average

man cannot distinguish them, he had better leave all hawks alone. Plenty of escape coverts can easily be provided and they furnish practical protection against even blue darters. The author sums up: "My experience indicates that an above-average quail population cannot only be maintained, but is more easily maintained by leaving hawks unmolested than by killing them."

Predation: Relative quantities of food consumed

Wooster, L. D. An attempt at an ecological evaluation of predators on a mixed prairie area in western Kansas, Kansas Acad. Sci. Trans. (Topeka) 41, 1938, pp. 387-394, 2 figs., 2 tables.

Discussion of the role of predators on the basis of food requirements per individual, number of individuals per square mile, and time present. Average daily numbers of coyotes and birds of prey are estimated by different methods that are explained. Amounts of food consumed are calculated from those given at two leading zoological gardens. A formula applied to the data is F x T x N = RI in which "F is food per day in grams; T is time--fraction of a year; N is numbers per square mile; RI is relative importance." The figures arrived at are for, the coyote 381, marsh hawk 611, Swainson's hawk 226; rough-legged hawks 22; and other hawks and owls, together, 27. These figures express relative quantities (in grams) of food daily consumed per square mile on the area concerned. Annual figures are for marsh hawks 221,555; coyote 139,065; and Swainson's hawk 82,490. "The annual food importance of the marsh hawk, expressed in avoirdupois weight is 494 pounds, or almost one fourth ton. In terms of meadow mice the marsh hawks on one square mile would require sixteen mice per day, or 5,840 per year. The coyotes on one square mile (one half an animal), if they ate nothing but jackrabbits, would require 45 per year. To supply the annual needs of all dominant predators on one square mile of mixed-prairie would require, for example, 150 jackrabbits, or 12,000 meadow mice, or 50,000 harvest mice." No data are given on the productiveness of prey species on the area--information that is necessary, however, to complete valuation of the predators.

Propagation: Aix

Parsonson, W. J. Foreign and domestic waterfowl in captivity, Modern Game Breeding and Hunting Club News (J. A. Gardy Printing Co., 28 W. State St., Doylestown, Pa., 25 cents a copy), 8(12), Dec. 1938. p. 10.

Care of mandarin and wood ducks; nest boxes, food, cover, sanitation.

Propagation: Goose, Canada

Kiehlbauch, Wm. Geese easy to raise, South Dakota Conservation Digest (Dept. of Game and Fish, Pierre, S. Dak.), 5(11), Nov. 1938, pp. 6-8.

Account of rearing the birds on "three city lots." In preparation for the breeding season, oats both whole and sprouted with a little corn are fed. First clutches of 6-8 are removed and in about ten days the females again start laying and produce 5-6 more eggs. The young are fed some oatmeal but

they and the adults as well subsist largely upon grass. Contrary to the usual experience, this breeder found that some geese losing mates will pair again in a short time.

Propagation: Irradiation results

Bissonnette, Thomas H., and Albert G. Csech. A third year of modified breeding behavior with raccoons, Ecology (Prince and Lemon Sts., Lancaster, Pa., $1.50 a copy), 20(2), April 1939, pp. 156-162, 7 tables.

Progress report on work that has previously been noticed in WILDLIFE REVIEW, Nos. 10, October 1937, p. 22, and 16, November 1938, pp. 33-34.

Propagation: Irradiation results, pheasants

Bissonnette, T. H., and A. G. Csech. Pheasants activated by night-lighting return to normal nesting, Journ. Wildlife Management (Victor H. Cahalane, National Park Service, Washington, D. C., 75 cents a copy), 3(1), Jan. 1939, pp. 26-30, 2 tables.

Authors' abstract: "Black-neck (5 hens), ring-neck (2 hens), and Mongolian (5 hens) pheasants, with cocks, were night-lighted, Jan. 6-April 3, in small pens without cover, then released into large pens, abundant cover, and normal days like those of controls (4 hens and a cock) of each variety. Experimentals began to lay Feb. 24, 21, 28, respectively, and averaged 0.377, 0.322, and 0.573 eggs per hen per day for first 15 days. Controls laid from April 7, 6, and 3, respectively, 0.485, 0.566, and 0.816 eggs per hen per day for their first 15 days. Hatchability of both controls and experimentals was high as judged by samples set under hens.

"After release, ring-necks laid only two eggs loose in the pen and built no nests; black-necks laid some scattered eggs, built a nest, and set on 12 eggs laid therein; Mongolians did likewise, setting on clutches of 12 and 13 eggs. Reset under hens, these clutches yielded 91% fertility and 83% hatch for black-necks and 87% and 79%, respectively, for Mongolians. These last two varieties can be used to get numerous early fertile eggs and still be planted later in suitable regions with good prospects of producing broods in the immediately following normal breeding season. Ring-necks seem to be less adaptable for such double use."

Propagation: Mortality in gallinaceous embryos

Asmundson, V. S. The position of turkey, chicken, pheasant, and partridge embryos that failed to hatch, Poultry Science (Dr. G. F. Heuser, Cornell University, Ithaca, N. Y., 75 cents a copy), 17(6), Nov. 1938, pp. 478-489, 6 tables.

Results in the case of ringneck, Mongolian, and Reeves pheasants, and chukar partridges were similar to those in poultry--turkeys and chickens. From the author's summary: "Embryos with head to the left or head between the thighs, whether in the large or the small end, rarely pipped the shell and

presumably very seldom hatch. A relatively high percentage of the embryos with head to the right pipped the shell and presumably may hatch regardless of whether they have the head in the large or small end or whether the beak is over or under the wing or towards or away from the air cell. Relatively more turkey embryos have the head in the small end of the egg when the eggs are incubated horizontally than when they are incubated with the large end up for the first 24 days. Such embryos, even when the head is turned to the right, are apparently handicapped by their position and, therefore, are less likely to hatch than those with the head in the large end. The difference in the incidence of embryos with head to the left from different strains and hens indicates that hereditary factors are involved." Bibliography of 18 titles.

Propagation: Partridge, Hungarian

Hunt, Roy M. Experiments with Hungarian partridge, Michigan Conservation (Michigan Dept. of Conservation, Lansing), 8(7), March 1939, pp. 4-5, 1 photo.

Four types of breeding pens tested; report on one season's experience; an elevated pen with half-inch mesh hardware cloth seems best. Details of construction and of the results with the birds kept in the different types are given.

Propagation: Pheasants

Silta, Henry. Do's and don'ts on pheasant raising, Game Breeder and Sportsman (205 E. 42nd St., New York, N. Y., 25 cents a copy), 43(2), Feb. 1939, pp. 21, 23.

Principal advice is to treat all species, common or rare, the same, and the best possible. A table gives the date of first egg laid and period of incubation at Great Barrington, Mass., of 39 kinds of pheasants.

Propagation: Quail

Abege, Roland. Quail hatcheries, Louisiana Conservation Review (Dept. of Conservation, New Orleans, La.), 7(3), Autumn 1938, pp. 19-22, 25, 3 photos.

Methods employed at a farm established at the State University for both practical and experimental purposes. Management of breeders, pairing and egg production, incubation, brooding, and miscellaneous techniques are discussed. Among the named is control of picking by the use of red lighting. There is general conservation discussion also and a plea for discrimination among hawks.

Propagation: Raccoon

Millard, Clarence. Raccoon experiment, Wisconsin Conservation Bul. (Wisconsin Conservation Dept., Madison), 4(3), March 1939, pp. 28-29, 1 photo.

Success in breeding females twice in a season; in November they appeared to be in just as good condition as those that had borne only one litter.

Propagation: Teals

Parsonson, W. J. The North American teal, Modern Game Breeding and Hunting Club News (J. A. Gardy Printing Co., 28 W. State St., Doylestown, Pa., 25 cents a copy), 9(3), March 1939, p. 11.

Notes on colors, number of eggs, and incubation period, besides hints on feeding and rearing.

Propagation: Vices

Bass, C. C. A practical remedy for the "nose-picking" form of cannibalism in young quail in close confinement, Modern Game Breeding and Hunting Club News (J. A. Gardy Printing Co., 28 W. State St., Doylestown, Pa., 25 cents a copy), 9(5), May 1939, p. 4.

Mentions trimming bills, liberal pen room on grass, and balanced rations, but from his own experience, recommends feeding chicks all the raw meat they will eat.

Propagation: Widgeons

Parsonson, W. J. The widgeon family, Modern Game Breeding and Hunting Club News (J. A. Gardy Printing Co., Doylestown, Pa., 25 cents a copy), 9(1), Jan. 1939, p. 10.

Descriptive notes on 3 species, and suggestions as to their care, especially feeding.

Propagation: Wild turkey

Boyers, Lillian E. Rearing wild turkeys in the wild, Game Breeder and Sportsman (205 E. 42nd St., New York, N. Y., 25 cents a copy), 43(1), Jan. 1939, pp. 2-3, 14, 2 photos.

General notes on the wild turkey and its habits with description of 5 years' experience in propagating these birds. The hens were allowed to select their nest sites and rear their broods undisturbed, control being exercised later and only as to their roosting quarters.

Research: Banding woodcock

Mendall, Howard L. A technique for banding woodcock, Bird-Banding (Charles B. Floyd, 210 South St., Boston, Mass., 75 cents a copy), 9(3), July 1938, pp. 153-155.

Discussion of 4 methods of which the best was use of a well-trained dog to locate young after they had left the nest, the dog being tied upon making a point.

Research: Bob-white's resistance to cold

Gerstell, Richard. Certain mechanics of winter quail losses revealed by laboratory experimentation, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg, Pa., 10 cents a copy), 9(2), May 1939, pp. 4-5, 28, 1 fig., 1 table.

References to literature on winter losses, description of the huddling habit, and of the experiments. The table shows average body temperatures of 80 quail taken in the gizzard and at three exterior points. The author's conclusions are: "(1) That the characteristic huddling habit of the bobwhite quail may at least in part represent an instinctive reaction which tends to reduce the heat loss from the bodies of the various individuals which make up any given covey; (2) that, at least within certain limits, the ability of a covey of quail to withstand low environmental temperatures is directly proportional to the size of that covey; (3) that the body temperature of individual quail may drop more than twenty-five degrees (Fahrenheit) below normal without the bird's suffering a breakdown of its thermal regulatory system which would result in death." He also says: "In closing, it seems fitting to call to the game manager's and sportsmen's attention the practical importance of the results obtained even from the few experiments so far completed. This lies in the indication that throughout the northern portion of the quail range, the bobwhite coveys should not be shot down to a point where their chances of winter survival are seriously endangered simply by too great a reduction in the average size of the bevies." Bibliography of 6 titles.

Research: Climatometer

Gerstell, Richard. The climoactometer. A device designed to measure the effects of various meteorological factors upon the activity and general physiology of animals, Pennsylvania Game Commission (Harrisburg, Pa.) Research Circ. 1, 20 pp., 8 figs., 1938.

The device described consists of an insulated chamber in which animals can be exposed to temperature, air movement, and precipitation as desired, of activity relays for measuring responses, and of an "actometer" for recording them. Illustrations include plans and photographs. Bibliography of 10 titles. [Composition of the name appears faulty. The principle of elision would seem to bar the use of two vowels together in the middle of the word. The alteration suggested in the caption of this abstract implies all but the recording feature of the machine, which it would seem can be taken for granted, as many measuring devices include self-recorders.]

Research: Essential basis of management

Taylor, Walter P. Value of wildlife research for proper land-use management, American Wildlife (Investment Bldg., Washington, D. C., 25 cents a copy), 27(4), July-August 1938, pp. 72-73, 77, 3 photos.

Wildlife management is a part of land use and a matter of national concern. Wildlife also is greatly worth caring for from a financial viewpoint. A number of questions are asked relative to practical wildlife management that can be answered satisfactorily only from fuller knowledge than is at present

available. The necessity of research as the basis for a sound conservation program is evident. In the present immediate great need of usable facts, research should be specifically directed toward desired objectives.

Research: Respirometer

Boettiger, Edward G. A simple respirometer for small animals, Nature (Macmillan and Co., Ltd., St. Martin's St., London, W.C. 2, England, 1 shilling a copy), 142(3586), July 23, 1938, pp. 151-152, 1 photo.

Description and illustration of a constant-pressure type of respirometer, developed at Harvard University, which permits direct reading of oxygen consumption.

Research: Tagging elk

Cramer, Albert J. Ear-tagging elk, Field Notes on Wildlife (U. S. Forest Service, Northern Rocky Mountain Region, Missoula, Mont.), 1(2), Feb. 1939, 5 pp., multilithed.

Report on 2 years' work on a small scale. The tagging was done with least disturbance to the elk by men using saddle horses. From 4-6 calves can be found and tagged daily by each man. It is best to work the same area only one day at a time and not more than 3 times all together. Notes are given on two adults found dead from natural causes and on 3 calves killed by coyotes. Returns from 4 tagged animals are cited, not enough to warrant conclusions. Continuance of the work is recommended.

Weights: Birds

Baldwin, S. Prentiss, and S. Charles Kendeigh. Variations in the weight of birds, Auk (Rudyard Boulton, Field Museum, Chicago, Ill., $1.00 a copy), 55(3), July 1938, pp. 416-467, 6 figs., 7 tables.

References in the bibliography of 51 titles are a good source of information on average and extreme weights of birds; this paper is an analysis of the variations in the weight of individuals of various species under different circumstances. A great deal of data is presented and discussed. Among conclusions are that "differences occur between the weights of different individual birds but such differences are scarcely greater than may occur in the weight of a single individual at different times." There are daily and yearly rhythms in the weight of the birds studied as well as variations correlated with temperature.

WILDLIFE RESEARCH AND MANAGEMENT LEAFLETS

Issues of interest to wildlife managers additional to those previously mentioned are listed below. Copies of these mimeographed leaflets can be obtained from the Biological Survey, U. S. Department of Agriculture, Washington, D. C.

BS-122. Big-game inventory of the United States, 1937, 13 pp., 17 tables, January 1939.

Compilation of information from a variety of sources of which the Federal land-administrative agencies were most productive. Data given for 15 kinds of animals in the wild or in no more than semi-confinement, e.g., the bison. Comparisons made when previous figures were available indicate increases for deer, elk, antelope, and black bear. The data are tabulated by States.

BS-123. Crow damage to fall grain crops in Oklahoma in 1937, by Ralph H. Imler and E. R. Kalmbach, 15 pp., 1 fig. (map), 3 tables, January 1939.

Based on studies made at intervals since 1920, report is made on the distribution and abundance of crows and on damage done especially to grain. Responses to a questionary on these points from more than 1,100 farmers are summarized and the results compared with those of field observations. Annual loss in the county most thoroughly studied exceeded $18,000. Further investigation is advised.

BS-124. Factors in nesting losses of the California valley quail, by E. E. Horn, 7 pp., January 1939.

California ground squirrels are the most serious check upon quail breeding; other inimical factors, and management are discussed. Bibliography of 7 titles. Reworking of the article with similar title abstracted in WILDLIFE REVIEW, No. 17, December 1938, pp. 34-35.

BS-125. Natural plantings for attracting waterfowl to marsh and other areas, 5 pp., January 1939.

Plants are recommended for improving: (1) areas characterized by muddy, fluctuating water (as in the Mississippi Valley); and (2) coastal marshes and marshland ponds. Correspondence is invited both as to these and other areas.

BS-126. History and significance of American wildlife: II, by H. P. Sheldon, 7 pp., February 1939.

A statement for educational use, commenting on the rapid exploitation of American natural resources, present day recognition of the need of conservation, planning wildlife restoration in the light of research, progress made in that direction and also in protective legislation, and restoration as a government function.

BS-127. An efficient trap for the fox ranch, by Charles F. Bassett, 2 pp., 3 pls., March 1939.

Trapping alive without injury is possible with a recently devised trap that is described and illustrated.

BS-128. A feeder for foxes, by Charles F. Bassett, 2 pp., 1 pl., March 1939.

Description, plans, and specifications of the feeder found most satisfactory at the U. S. Fur Animal Experiment Station, with notes on its use and care.

BS-129. Cooperative wildlife-management research, 1938, 4 pp., 3 tables, March 1939.

Locations, leaders, demonstration areas, subject of study, and students concerned in 11 projects. The units have contributed to the protection and management of wildlife, and to the training of men for conservation work.

BS-130. Seasonal fox rations and quantities to feed, by Charles F. Bassett, 3 pp., 2 tables, April 1939.

Permissible variations in rations, with especial reference to the raw-meat content, with suggestions as to kinds, quantities, and seasons for feeding; notes also on dietary requirements of males, females, and weaned pups.

BS-131. Suggestions on attracting birds, with references to available literature, 5 pp., 1 fig. (map), April 1939.

Brief suggestions with references to available official and current non-official literature (12 titles of each) on protection, nesting facilities, and water supply and food supplies.

BS-132. Some California wildlife-forest relationships, by E. E. Horn, 5 pp., April 1939.

Effects of forest-wildlife interactions; type of forest affects wildlife and vice versa; results of California studies. About the same material as abstracted under a similar title in WILDLIFE REVIEW, No. 17, December 1938, pp. 10-11.

BS-133. A preliminary investigation of the food habits of the mourning dove in Alabama, by Walter Rosene, Jr., 10 pp., 2 tables, April (May) 1939.

Analyses of 287 stomach contents presented in tables and text. More than 99 percent of the food was seeds of which those of grasses, especially cultivated grains, were most important (55 percent). Other leading sources of food were: Pokeweed, chickweed, legumes, dovewoods, evening primrose, and ragweeds. Animal food was insignificant.

BS-134. A summary of the gray squirrel investigation in southeastern Ohio, by Floyd B. Chapman, 9 pp., 4 tables, April (May) 1939.

Results cited as to weights, sex ratios, age-class groups, dens and leaf nests, mating period and litters, and parasites and diseases. There are also reports on population studies and an analysis of squirrel hunting; recommendations as to management; and bibliography of 12 titles Much the same material as previously abstracted in WILDLIFE REVIEW, No. 17, December 1938, p. 19.

SPECIAL ARTICLE

Sources of material abstracted in WILDLIFE REVIEW (Numbers 1-21)

Only a summary is here presented but details can be supplied later if there appears to be sufficient demand.

Books and other independent publications accounted for 34 abstracts.

Sources of others are given in the following tabulation.

USONIAN PUBLICATIONS

Federal

	Number of Abstracts
Department of Agriculture	
Departmental Series	62
Biological Survey	97
Forest Service	60
Soil Conservation Service	25
All others	7
Other Departments and Agencies	22
Congress	13

Federal-State Cooperatives

Minnesota	30
Ohio	17

State Conservation Departments

California	28
Maryland	13
Michigan	28
Minnesota	20
North Carolina	16
Ohio	19
Pennsylvania	73
Wisconsin	24
All others	34

Other State Departments and Agencies

All together	10

Agricultural Colleges and Experiment Stations

Cornell	5
Michigan	7
All others	24

Other College and University Publications

Cornell	6
Idaho	20
Iowa	6
All others	18

Publications directed to, or supported by, Sportsmen

American Wildlife Institute	
American Wildlife	39
Special Publications	5
Transactions North American Game Conferences	284
Game Breeder and Sportsman	34
Modern Game Breeding and Hunting Club News	31
All others	71

Academies of Science

All	15

Agricultural Journals

All	35

Bird Magazines

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Wilson Bulletin	27
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Botanical Journals

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Conservation Periodicals

Journal of Wildlife Management	57
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Entomological Journals

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Forestry Journals

Journal of Forestry	45
All others	20

Miscellaneous Periodicals, mostly Scientific

Ecology	22
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Proceedings of the New Jersey Mosquito Extermination Association	23
All others	87

FOREIGN PUBLICATIONS

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Canadian Field-Naturalist	14
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Remainder of British Empire

Imperial Chemical Industries Advisory Leaflets	19
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NOTES AND NEWS

Biological Survey: Federal Aid to the States.--In March it was reported that 47 States had indicated that they wish to participate in the new Federal-State cooperative plan for wildlife restoration and that of 67 projects submitted by 31 States, 32 had been approved and funds set aside in the U. S. Treasury for the work.

Biological Survey: Refuges.--The Kofa and Cabeza Prieta game ranges in Arizona, recently established by Executive Order, have added more than a million and a half acres to the Federal areas devoted to wildlife conservation. Set apart primarily as refuges for mountain sheep, or bighorns, the two ranges will also afford protection and security to other species of wildlife, among them, the antelope, peccary, mule deer, and Gambel's quail. The proximity of the Cabeza Prieta Game Range to the Mexican border lends an unusual international interest. Already negotiations are pending with the Mexican government for the establishment of a similar game range adjoining and south of the border.

Biological Survey: Writing.--A 3-page mimeographed leaflet entitled "Those Sporting Plurals" has been issued. It treats the pluralization of animal names, especially those often used in sporting parlance in the same form, singular and plural. Copies may be had upon application to Technical Adviser, U. S. Biological Survey, Washington, D. C.

In Delaware Game and Fish News (1(3), December 1938, p. 3) is the interesting statement that the restocking investment of the State Game and Fish Commission for the last three years amounted to 12 cents per acre or about $7.60 per square mile for the entire State.

The large toad, Bufo marinus, has been introduced from Porto Rico into Florida to aid in the control of cutworms and other insects. (Ann. Rep. Fla. Agr. Expt. Sta., 1937, p. 142).

Numerous papers presented at the first and second Idaho Game Management Conferences, 1937 and 1938, have been printed in the University of Idaho (Moscow) Bulletin (Vol. 33, No. 22, December 1938, 98 pp.). Thirty-two articles are printed, of which 21 are abstracted in the last three issues of WILDLIFE REVIEW. Five papers presented but not printed and 6 informal talks also are listed as part of the proceedings. The bulletin was edited by A. B. Hatch who also supplied a foreword.

The Annual Report of the Ohio Wildlife Research Station for 1937-38 has appeared in mimeographed form (Release 89, Ohio Wildlife Research Station, Columbus, 10 pp., n.d.). The objectives, location, staff, and student personnel are listed, the status of 16 projects tabulated, the uses to which results of the research program have already been put are recorded, and educational activities, publications, manuscript reports, maps, and research forms and outlines, summarized.

From the South Dakota Conservation Digest for November 1938, we learn that pheasants were first introduced in that State in 1912. The twentieth consecutive open season was in 1938 and during those two decades, "a conservative estimate discloses that some 17,500,000 of these birds have been legally taken by hunters. This makes a total of more than 25 million pounds of dressed meat, equivalent to 25,000 two-year-old fattened beeves 'on the hoof', or ten train loads of 100 cars each."

"Smaller Homes.--With the lion's share of a continent at our disposal, we Americans are rather given to thinking of wildlife conservation in very large and spacious terms. The idea that anything worth while can be done in less than a thousand square miles seems hardly worth considering.

"Yet two of Europe's smaller countries, Denmark and the Netherlands, have well-worked-out systems for the protection and encouragement of wildlife, despite the intensive utilization of the last inch of cultivable land necessitated by their limited territories and dense populations.

"In Denmark, the government may create wildlife preserves, upon suitable compensation to the landowners. But landowners themselves may set up preserves if they so desire, with the scientific advice and assistance of the government. Two types of wildlife preserves are provided for, intended respectively for game-providing and scientific purposes.

"In the Netherlands the cause of wildlife conservation is a genuinely popular one. There is a well-organized society for nature protection, with a membership of 13,000, who are backed by other and even larger organizations such as the bicyclists' union, with over 100,000 members. These groups have been so well able to swing public opinion--not to mention fiscal legislation--that in the past 31 years no less than 39 game and wildlife sanctuaries have been established.

"As in Denmark, private landowners are encouraged to put some of their lands to use for the benefit of wildlife. In the Netherlands, this encouragement takes the practical and highly tempting form of a partial remission of taxation. As a result, more than 325 large estates, with a total of over 125,000 acres, have taken advantage of this law--and given the country the advantage of their utilization as homes for game and wildfowl." (Science News Letter, 36(7), February 18, 1939, p. 110.)

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